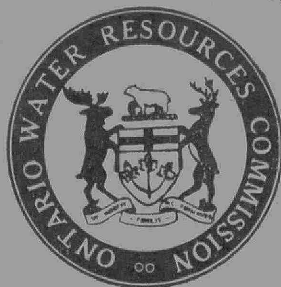


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WR 610
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O.W.R.C.
Water Pollution
Survey

THE
ONTARIO WATER RESOURCES
COMMISSION



WATER POLLUTION SURVEY



JUN 5 1970

RECEIVED

of the
POLICE VILLAGE OF LYNDEN
COUNTY OF WENTWORTH

1969

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CASON
WR610
1969
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REPORT
on
WATER POLLUTION SURVEY
of the
POLICE VILLAGE OF LYNDEN
TOWNSHIP OF BEVERLY AND ANCASTER
COUNTY OF WENTWORTH
1969

Prepared By: District Engineers Branch
Division of Sanitary Engineering

TABLE OF CONTENTS

INTRODUCTION

I Existing Services

- a. Sewage
- b. Water
- c. Municipal Refuse Disposal

II Presentation of Results

III Discussion of Results

- a. Area Watercourses
- b. Open Storm Ditches
- c. Fire Pond

IV Conclusion

V Recommendations

APPENDIX I

APPENDIX II

APPENDIX III

TABLE I

TOWNSHIPS OF BEVERLY AND ANCASTER

Water Pollution Survey

INTRODUCTION

A pollution survey was carried out in the Townships of Beverly and Ancaster, Police Village of Lynden, on September 27, 1968 and April 9, 1969.

The survey was carried out to determine the extent of pollution, if any, existing in the Police Village.

The Police Village of Lynden is located on Highway 99 approximately ten miles west of the Town of Dundas and in the south-west portions of the Townships of Beverly and Ancaster with the majority of the Police Village being in the Township of Beverly.

The population of the Police Village is as follows:

- * Township of Beverly 545 persons

- Township of Ancaster 36 persons

- * obtained from the 1969 Municipal Directory

Both the Townships of Ancaster and Beverly are incorporated in the Wentworth-Hamilton Planning area.

1. EXISTING SERVICES

a. Sewage

There are no municipal facilities for the collection and treatment of domestic sewage within the Police Village. The disposal of sanitary wastes is left to the individual property owners and in most cases this consists of septic tank systems.

Only systems installed since the advent of the Wentworth County Health Unit (Hamilton-Wentworth Health Unit) have been supervised

b. Water

There are no municipal water supplies in the Police Village,

c. Municipal Refuse Disposal

The Police Village uses the Township of Beverly refuse disposal site which is located at Lot 22 Concession 6 in the Township of Beverly. This site presents no pollution problem to area watercourses.

2. PRESENTATION OF RESULTS

The results of the samples along with a map indicating the sample locations can be found in Appendix II.

An explanation of the results can be found in Appendix I.

3. DISCUSSION OF RESULTS

A total of twenty-eight samples were obtained during the survey with the number of chemical and bacteriological samples being evenly divided.

A breakdown of the samples obtained are as follows:

- a. 8 samples from area watercourses
- b. 19 samples from open road ditches
- c. 1 sample from fire pond.

a. Area Watercourses

Samples were obtained from both of the tributaries to Fairchild Creek which flow through the Police Village (see Appendix II Table I)

With the exception of sample location number 11 the BOD and suspend solids concentrations were relatively low. Sample location number 11, which is located downstream from the Ella-Riva Farms waste holding ponds, indicated a high BOD count.

ABS (anionic detergents) which indicates pollution originating from a domestic source was evident at sample location numbers 1 and 11 while phenols were noted at all the sample locations

Sample location number 8 indicated a high coliform organism count while fecal coliforms, which are found in the intestinal track of man and other warm blooded animals, were present at sample location numbers 1 and 8.

b. Open Storm Ditches

Chemical and bacteriological samples were obtained from sample location numbers 2, 3, 5, 6, 9 and 10. (see Appendix II Table I)

The chemical samples indicate gross pollution at sample location numbers 3 and 5 on the September 27, 1968 with the BOD and suspended solids being in excess of the recommended level of 15 ppm each.

ABS concentrations above the recommended limit of 0.5 ppm were noted at sample location numbers 5 and 9. Phenols were evident in all the samples.

High coliform and / or fecal coliform organisms were noted at all the sample locations.

c. Fire Pond

With the exception of phenols being present the chemical and bacteriological sample obtained from the pond were found to be satisfactory.

4. CONCLUSION

From the samples obtained during the above inspections, pollution of the open ditches and to some extent the tributaries of Fairchild Creek is occurring. This is shown by either high BOD and suspended solids concentrations, the presence of ABS and phenols or high coliform and fecal coliform concentrations.

Correction of the defective sewage disposal systems on an individual bases would not appear to be feasible due to the small lot sizes in the Police Village. It would appear that the only satisfactory and permanent solution is the development of sanitary sewers in the Police Village.

5. RECOMMENDATIONS

It is recommended that sanitary sewers be provided in the Police Village of Lynden.



W. B. Pett, Technician,
Division of Sanitary Engineering.

WBP:pr

T A B L E I

P.V. of LYNDEN

Sample Location and No.	Date Sampled	5-Day BOD	Susp.Solids	Anionic Detergents as ABS	Phenols in ppm	Coliform per 100 ml	
						TCO	E.Coli
1. Fairchild Creek - Lot 13 Conc.1 (Apr.9/69)	Sept. 27/68	1.6	27	0.0	0.003	2,100	220
	Apr. 9/69	1.0	10	1.0	0	28	360
2. Lynden Rd. N. - ditch south of Ella R. Farms (Apr. 9/69)	Sept. 27/68	3.0	32	0.0	0	6,600	6,600
	Apr. 9/69	1.2	30	0.1	0.012	20	0
3. Lynden Rd. N. Culvert (Apr. 9/69)	Sept. 27/68	82	1052	0.3	0.008	68,000	23,000
	Apr. 9/69	1.0	10	0.3	0.011	50	0
4. Fire Pond south of Railway Tracks	Sept. 27/68	4.8	32	0.0	0.003	400	32
5. Road ditch on Howard St. Apr. 9/69	Sept. 27/68	6500	970	1.4	1.000	8M+	80,000+
	Apr. 9/69	4.5	110	0.6	0	270	60
6. Road ditch - Pearl St.	Sept. 27/68	11	11	0.1	0.004	5,600	1,500
8. Fairchild Creek at Hwy.99	Sept. 27/68	2.0	28	0.0	0.002	10,000	1,000
9. Culvert northwest corner Howard & Hwy.99	Apr. 9/69	3.5	10	0.5	0.006	8M	47,000
10. Fairchild Creek beside Fire Hall	Apr. 10/69	10	20	0.2	0.004	580,000	2,500
11. Fairchild Creek down- stream behind Ella River Farms	Apr. 9/69	80	15	0.3	0.002	790	0

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



ELLA RIVA FARM
HOLDING POND

2

3

11

MILL ST.

FIRE POND

4

BARNABAS ST.

C.N.R.

ALBERT ST.

10

ORPHEUS ST.

MAPLE ST.

PEAR' ST.

6

QUEEN ST.

OAK ST.

HOWARD ST.

UNION ST.

LIBERTY ST.

PARK ST.

9

RD.

LYNDEN RD.

FAIRCHILD CR.

FAIRCHILD CR.

(TRIBUTARY)

(TRIBUTARY)

BEVERLY TWP.

HWY. No. 99

THE GOVERNOR'S

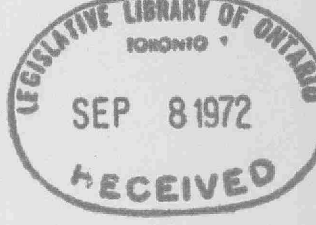
ANCASTER TWP.

LEGEND

6 - SAMPLING POINTS

COUNTY HWY. No. 5

CADON
WR 610
1969
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Out.
Envir
Water. Treat

ONTARIO WATER RESOURCES COMMISSION

POLICE VILLAGE OF LYNDEN
TOWNSHIPS OF ANCASTER & BEVERLY
WATER POLLUTION SURVEY
1969

SCALE: 400 0 400 FT.

DRAWN BY: L.L. BROOME DATE: JUNE, 1969

CHECKED BY: B. P. DRAWING No: 69-66-DE



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